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ABSTRACT

This guide for those in the "High Schools That Work" initiative is designed to help teachers use classroom assessment to motivate students to work harder to meet challenging standards; to get students to organize information, make interdisciplinary connections, synthesize new knowledge, and draw conclusions from what they learn; to promote independent learning and personal responsibility; to change the nature of academic and vocational instruction from simply teaching facts and procedures to teaching how to research, plan, evaluate, think, and solve problems; and to encourage students to use continuous reflection and self-assessment. The guide covers the following topics: (1) standards-driven assessment for academic skills, technical skills, thinking skills, and personal skills; (2) assessment strategies, such as multiple-choice tests, short-answer tests, essay exams, problem-based questions, scenarios and case studies, projects and products, presentations and performances, and portfolios; and (3) guiding principles for using assessment to improve student learning. Discussion and examples of classroom use are provided for each topic. (KC)

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ED 452 397

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HIGH SCHOOLS THAT WORK

Advancing Students' Academic and Technical Achievement by Improving Classroom Assessment

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SITE DEVELOPMENT GUIDE #10

Southern Regional Education Board

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Advancing Students' Academic and Technical Achievement by Improving Classroom Assessment

During the last two decades, the knowledge and skills needed for success in America have changed dramatically. A high school diploma is no longer a "ticket to the middle class." Americans now need a higher level of education and the ability to find, organize and use information to deliver high-quality products and services.

The new economy places a much higher value on the "new basics": retrieving information, organizing it, synthesizing it into a plan and constructing a variety of written and oral responses. Basic knowledge no longer is just arithmetic; it now includes algebra, geometry, statistics and problem-solving. Basic knowledge requires the ability to apply the scientific process; work in teams; and understand, manage and use technology.

In the mid-1980s, the Southern Regional Education Board and a group of state leaders presented a vision of how high schools could prepare all students to compete for good jobs and to pursue further education. Through the SREB's *High Schools That Work* initiative, more than 900 high schools in 22 states are involved in raising standards and helping all students to meet them. *HSTW* sites agree to change what and how students are taught.

As schools change the way they teach, they need to improve how they assess students. The purpose of this guide is to help teachers use classroom assessment to:

- motivate students to work harder to meet challenging standards;
- get students to organize information, make interdisciplinary connections, synthesize new knowledge and draw conclusions from what they learn;
- promote independent learning and personal responsibility;
- change the nature of academic and vocational instruction from simply teaching facts and procedures to teaching how to research, plan, evaluate, think and solve problems; and
- encourage students to use continuous reflection and self-assessment.

Standards-Driven Assessment

Standards are desired results of student performance that can be measured. The main purpose of assessment is to give teachers and students a clear picture of the progress students are making in meeting standards. No matter what assessment strategies are used in the classroom, there must be challenging curriculum standards around which teaching can be based and against which students can be measured. Local, district, state and national agencies and organizations may be involved in setting standards. A "standards statement" usually begins with a phrase such as "students will be able to" or "students will demonstrate."

Teachers should share the standards with their students. As a "contract" between teachers and students, standards communicate what teachers will teach and what students will be expected to learn. Grades or point systems measure to what extent students have mastered each standard.

Standards may address a variety of knowledge and skill areas or may focus on one area. The four major skill areas are academic, technical, thinking and personal skills. Some standards combine academic and technical skills. Discussions of each of the four major skill areas follow.

■ *Academic skills*

Academic knowledge and skills include subjects such as English, mathematics, science and social studies. Professional teaching organizations have developed national curriculum standards, and teachers may want to order copies of them.

Resource List for National Academic Standards

Council for Basic Education
1319 F St. N.W., Suite 900
Washington, D.C. 20004-1152
Phone: (202) 347-4171
Fax: (202) 347-5047
E-mail: info@c-b-e.org

National Council of Teachers of Mathematics
1906 Association Drive
Reston, VA 22091
Phone: (703) 620-9840

National Science Teachers Association
1840 Wilson Blvd.
Arlington, VA 22201
Phone: (703) 243-7100

National Council for the Social Studies
3501 Newark St. N.W.
Washington, D.C. 20016
Phone: (202) 966-7840

■ *Technical skills*

Technical knowledge and skills are specific to a particular career area or to a certain business or industry. It is important to teach and assess broad-based as well as job-specific skills in high school. For example, an automotive instructor may expect students to be able to diagnose a problem with a customer's vehicle and to communicate the problem to the customer. But students also may be expected to demonstrate knowledge of the economic and environmental impacts of emission control standards.

Technical standards reflect knowledge and skills related to planning; management; finance; principles of technology; health and the environment; structure and organization; historic perspective; human resources; economic principles; and government regulations.

Many state agencies and private organizations have defined industry standards. At the national level, various industries have developed standards, but teachers may wish to broaden these to make them more challenging.

Skill standards have been developed in the areas of health, general construction, electrical construction, agribusiness, photonics, electronics, computer-assisted design, automotive, hazardous waste, chemical processing, metalworking, retail trade, hospitality and tourism, human services, laundry, grocery, welding, bioscience, printing, and heating and air conditioning.

For more information on national industry skill standards, contact the National Skill Standards Board at 1455 Pennsylvania Ave. N.W., Suite 500, Washington, D.C. 20004-1978. The telephone number is (202) 347-2270, and the organization has a Web site: www.nssb.org.

■ *Thinking skills*

Thinking skills — such as creative thinking, decision-making, problem-solving, knowing how to learn, and reasoning — apply to all environments. These skills can — and should — be emphasized in all academic and vocational classrooms. To strengthen students' thinking skills teachers can ask them to create designs, find new solutions, develop procedures for solving a problem or completing a project, and explain their reasons for doing something a certain way.

■ *Personal skills*

Standards also may address personal development — taking responsibility for one's own learning; working with and learning from others; demonstrating self-management, including the ability to complete assignments on schedule; and exhibiting integrity.

A Variety of Assessment Strategies

One form of assessment is not necessarily better than another. The type should be selected based on the purpose of the assessment and the knowledge and skills to be measured. Different assessment strategies promote different types of learning and provide different kinds of information, so one may be better than another for a certain purpose.

Examples

- When a science teacher wants to assess a student's ability to identify body parts and to define biological terms, a paper-and-pencil test may be the most appropriate assessment.
- When this science teacher wants to assess a student's ability to think and solve problems as a member of a research team, a laboratory assignment or experiment may be the best method.
- When the science teacher wants to assess the quality of a student's work on multiple assignments over a period of time, a portfolio of the student's work throughout the school year may yield the best information.

Curriculum and assessment go hand in hand. Just as different teaching strategies are needed for different curriculum content, different assessment strategies are needed to measure students' skills and depth of understanding. In a 1998 survey of 26,000 academic and vocational teachers at *High Schools That Work* sites, 76 percent of teachers said that different teaching methods can affect student achievement. Multiple teaching and assessment strategies are needed to challenge all students.

Assessments are administered to determine whether a student has met specific standards, and multiple assessment strategies can be used. The ones selected will depend on the standards they are intended to measure and the time available to assess students. Multiple assessments can give teachers the most comprehensive information about students' learning.

One way to look at assessment is to consider how the assessment is administered. Some assessments are done "on demand," while others are "cumulative." Both should be incorporated into the classroom. In an on-demand assessment, students are tested during a class period or another short time span. This type of assessment also measures how a student performs under pressure. In a cumulative assessment, a teacher measures the knowledge and skills a student has acquired over an extended period of time, such as several weeks, during which students may have opportunities to revise their work. This type of assessment may even extend across grade levels.

Assessments also differ in the ways that students generate their responses. In a "selected-response" assessment, students are given answers from which to choose. These assessments include multiple-choice questions, true/false questions and matching items. In a "constructed-response" assessment, students create their own answers. Teachers may require a traditional method, such as an essay or a mathematical solution, or they may use an "alternative" strategy, such as a portfolio or a project.

Constructed-response assessments (including alternative assessments) can be complex, but they do not need to be. For example, some schools require students to complete a senior project that consists of a product, a research paper and an oral presentation. In another approach, teachers may ask students to do projects that take only one or two days to complete. Teachers should select projects based on students' needs, the nature of the school's standards, and the time available to use alternative assessments.

The following section will review a number of assessment strategies: multiple-choice tests, short-answer tests, essay exams, problem-based questions, scenarios/case studies, projects/products, presentations/performances, and portfolios. Because each teacher has particular classroom needs, there is no

Selected-response assessment	Constructed-response assessment
■ Easier to develop, administer and score ■ More efficient use of students' time ■ Strong theoretical basis for judging the quality of the results ■ Familiar to teachers, students and the community ■ Good for measuring factual knowledge	■ Easier to incorporate real-life applications ■ A better way to measure real performance ■ Appropriate for more complex tasks, critical thinking and problem-solving ■ Good for measuring deeper understanding of a topic

"right" strategy. For example, one teacher may administer an on-demand essay exam (constructed response). Another teacher may use a cumulative writing sample (constructed response) that students will create and revise over a period of three weeks. Although both strategies involve writing, the standards they assess can be very different.

This section is intended to encourage educators to think deeply about their classroom practices and their uses of assessment. How can classroom assessment be used to motivate more students to do higher-quality work? How can instructional practices be improved through assessment?

Application Step: Think about your classroom and answer the following questions:

1. What assessment strategies do you use in the classroom? What percentage of time (should equal 100 percent) do you use each one? What percentage of time would you prefer to use each one?

Assessment strategy	Percentage of time used	Percentage of time desired
Multiple-choice tests	%	%
Short-answer tests	%	%
Essay exams	%	%
Problem-based questions	%	%
Scenarios/case studies	%	%
Projects/products	%	%
Presentations/performances	%	%
Portfolios	%	%
Total	100%	100%

2. Which quadrant represents most of your classroom assessments?

Selected response, on-demand	Selected response, cumulative
Constructed response, on-demand	Constructed response, cumulative

Multiple-Choice and Short-Answer Tests

Like all assessment strategies, multiple-choice tests are most effective when there is a clear purpose for using them and they are combined with other forms of assessment. The problem with multiple-choice tests is not the tests but the assumption that they will provide all of the information necessary to judge a student's knowledge and skills. Multiple-choice tests are valid and reliable in measuring student performance on defined standards.

There are two types of tests based on the way in which the results are used:

- **Norm-referenced** tests show how a student performs in relation to other students — for example, the Scholastic Assessment Test (SAT) or the Iowa Test of Basic Skills. Norm-referenced tests are administered first to a representative sample of students (the norm group). Their results are used to establish norms against which other students' performance can be measured.
- **Criterion-referenced** tests measure specific knowledge and skills and are used to support generalizations about a student's performance in relation to a specified set of tasks. Students are judged against performance standards or criteria. Examples of criterion-referenced tests include the National Assessment of Educational Progress (NAEP) and Advanced Placement exams. Employers' technical or licensing exams are criterion-referenced to a list of standards and required performance levels.

In the classroom, criterion-referenced tests are the best way to assess whether a student meets high standards. Norm-referenced tests have no absolute standard against which to measure individual performance.

Multiple-choice and written short-answer tests are efficient ways to test a student's knowledge of facts or skills. These tests often measure a fixed set of items with "right" and "wrong" answers. It is important to note the standards that can and cannot be measured by multiple-choice or short-answer tests and to choose other assessment strategies to measure standards that they cannot.

Application Step No. 1: Before administering a multiple-choice or short-answer test, ask yourself the following questions:

1. If a student completed this test, what would I know about his or her knowledge and skills? What wouldn't I know?
2. What standards does the assessment measure?
3. What other assessment strategies can I use to challenge students to meet high standards?

Application Step No. 2: When measuring students' understanding, it often makes more sense to ask short-answer questions than multiple-choice questions. For example, suppose a teacher wishes to test students' understanding of concepts related to the following standard: "All students will develop an understanding of motion and force and will be able to apply these concepts to daily life."

Multiple-choice tests that ask students to recall the definitions of key concepts related to motion and force (such as velocity and speed) may not gauge their understanding of the concepts or their ability to apply them. However, short-answer questions such as the following come closer to testing students' understanding:

- What is the difference between speed and velocity?
- If a car moves with constant velocity, does it also move with constant speed? Explain.
- If a car moves with constant speed, can you say that it also moves with constant velocity? Give an example to support your answer.

Using one of your standards, practice writing multiple-choice or short-answer questions that challenge students to understand and apply what they have learned. Ask another teacher for feedback on the questions.

Essay Exams and Problem-Based Questions

Essay exams and problem-based questions measure higher levels of understanding and application by testing factual knowledge, critical thinking, and the ability to argue in writing. Such tests require teachers to be creative in developing the questions and students to be creative in responding to them. To assess students' knowledge effectively, teachers need to develop questions related to what, how and why. Good questions are the key to good assessment strategies that cause students to integrate knowledge.

Essay and problem-based exams can be administered as on-demand assessments with a time limit, such as one class period. Prior to giving students a series of questions to answer or problems to solve, teachers should communicate their writing standards to the students and teach essential content. If the teacher prefers a specific style of writing, he or she should provide samples and discuss them with the class in advance.

Examples of essay and problem-based questions:

- What are some options for implementing managed health care nationally? Describe the pros and cons of different health plans.
- How would you trouble-shoot and repair AC capacitive circuits as opposed to AC inductive circuits? (See the national skill standards for electronics.)
- What is the history of broadcast technology in America from the 1900s until today? How has this technology influenced our social and cultural values, as well as our lifestyles?
- From the early 1800s to the early 1900s, trains were a primary means of transporting people from one place to another. What caused the decline in the number of railway passengers? What would you recommend to a transportation company such as Amtrak to increase the number of riders?
- You are responsible for preparing specimens for an assay that requires immediate centrifugation. What are the steps in preparing a specimen for centrifugation? (See the national skill standards for bioscience.)
- After a client examines plans for his new home, he wants to add a second story. As a draftsman,

you tell him the foundation will not support a second story and that you will need to adjust the plans. How would you change the plans? Redo the specifications. (Give students a diagram.)

- If you owned a restaurant and a customer complained of a bug in his soup, what would you do?

Guidelines:

1. **Develop questions from the standards to be assessed.** If the standard to be tested in an electronics class is "The student will demonstrate an understanding of the characteristics of capacitors and inductors," the teacher would develop a question or problem that focuses on concepts related to this standard. Teachers may allow students to develop questions that reflect standards.
2. **Decide which written communication skills the question (or thought process) will require students to demonstrate.** Different questions require practice in different types of responses and skills. For example, students may be asked to demonstrate a linear process or a step-by-step procedure, such as the steps in performing cardiopulmonary resuscitation (CPR), to argue in writing, document history, or otherwise demonstrate written communication skills.
3. **A good question not only tests students' understanding of key concepts but also requires them to apply that understanding.** Students have a better chance of retaining and applying knowledge if they understand how a concept works in the real world. If students simply "regurgitate" a concept learned in the classroom, they may forget it immediately after the exam.
4. **Before administering an exam, develop guidelines for scoring the answers to open-ended questions.** Give serious attention to grading open-ended questions. It may be helpful to involve the students in designing guidelines to measure achievement.

Examples from High Schools That Work *sites*

- All students are required to take a theory of mathematics course to learn how to use mathematics in everyday situations and the workplace. The course also has a technical writing component that develops students' understanding of the scientific and statistical uses of mathematics. (Woodville High School, Woodville, Texas)
- Educators began several initiatives to improve writing scores, which were particularly low on the state writing exam. In a writing-across-the-curriculum initiative, teachers in every subject

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Application Step: Using your standards, develop essay questions or problem-based questions and ask other teachers for feedback. Other teachers in your field may see the topics differently; teachers from other fields may suggest ways to assess additional skills. Peer review is important.

After developing your exam questions, answer the following questions:

- What standards can I realistically expect to measure with the questions I developed?
- How can I improve the questions to require higher levels of analysis?
- What written communication skills are included in my assessment?
- What criteria will I use to judge responses?
- How can I get students to develop questions that apply to a certain standard?

area assigned and assessed writing after being trained to use the state's grading guidelines. Students wrote essays under state-test conditions and received feedback from a writing instructor. As a result of these efforts, students' scores on the state writing test are higher. (Polytech High School, Woodside, Del.)

- Before making a business-writing assignment, the teacher reminds students that the assignment is "real" and that they should do their best work. After the letters are written, she announces that she intends to mail them. Students rush to retrieve their letters, aiming to improve them before they are sent. When students are convinced that an assignment is real, performance improves. (Marion County High School, Lebanon, Ky.)

Scenarios/Case Studies

Scenarios or case studies usually are longer and more involved than problem based questions. Graduate programs in management and other fields often use case studies and role playing to encourage students to explore options or solutions individually or with other students. Scenarios or case studies require students to apply knowledge of a subject or subjects and to use decision-making skills in determining the best action to take. This type of assessment challenges students to think deeply about how they feel about an issue. Students may be asked to contrast points of view, find similarities, and/or use higher-order thinking skills to solve a problem.

Standards: Students will demonstrate individual responsibility and integrity. They will understand the role of ethics in the workplace.

- You are an administrative assistant to the president of the largest bank in town. Your boss is well-liked and always has treated you with respect. Little by little, you learn that he is using corporate funds for personal use: He purchased two tickets to Europe for a family vacation; he paid the catering bill for his daughter's wedding; he bought a computer for his wife's home office. One day a newspaper reporter begins asking questions. The reporter obviously is "wise" to your boss. What do you do in this situation? Why?

Standards: Students will understand the role of interest group politics in the legislative process at the local, state and national levels. Students will demonstrate an understanding of the political process as it relates to urban planning and architecture.

- A community group is up in arms over a new bike path the city has hired you to develop. The group says the path will create traffic problems in the area and will disturb the environment. You see no basis for these claims. The group is very vocal and is threatening to halt the project. The city is unsure about what to do. What would you recommend as next steps?

Standards: Students will demonstrate procedural and trouble-shooting skills in bioscience. They will use teamwork, communication and problem-solving skills in laboratory procedures.

- You belong to a team involved in monitoring the environmental testing of a cell line. Your responsibilities include routine observation and maintenance. You have a healthy cell culture in a flask, and you transfer the culture to a fresh growth medium in a larger vessel for scale-up. After 24 hours, the viability of the new cell culture has dropped to 70 percent. What would you do to address this problem in a routine procedure? What would you do in an experimental procedure? (Example taken from the bioscience industry skills standards of the Education Development Center Inc.)

Application Step: Develop scenarios and case studies with peer input. After they are developed, answer the following questions:

- What standards can I realistically expect to measure?
- How can I improve the scenarios or case studies to require higher levels of analysis?
- What criteria will I use to judge responses?

Projects, Products and Presentations/Performances

A project or a product provides an opportunity for a student to demonstrate integrated knowledge and skills. A project can be small in scope (lasting a few days) or very large in scope (lasting from one semester to a year), and the size of the scope depends on the purpose. For example, a project that is meant to be the culmination of a student's high school learning experiences may last a semester or a year. At the end of that time, students may give an oral presentation based on a written research report and a product. A two- to three-day project may be related to a chapter in a textbook on a topic such as the Pythagorean theorem. Students can complete long-term and short-term projects individually and in groups.

Projects must be tied explicitly to standards. It is important to determine the project's or product's purpose before it begins. The curriculum contains essential standards that focus on what "must" be taught as opposed to what would be "fun" or "nice" to teach.

Examples from High Schools That Work *sites*

- English students in 12th grade develop specialized language skills by completing a senior project. They research an area of interest and write a paper or prepare a multimedia presentation. Each student selects a faculty member and someone from the community to judge the pro-

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Application Step No. 1: Teachers at *High Schools That Work* sites have assigned the following long- and short-term projects. Which standards do these projects measure? How would you structure the projects to ensure that they address required curriculum standards rather than meaningless objectives? When students choose projects to demonstrate their understanding of academic and technical skills, teachers can help structure the projects around required curriculum standards.

Long-term projects may include:

- building a house;
- chronicling a semester-long internship in a hospital;
- researching and writing a paper on the history of manufacturing in America from 1890 to 1995;
- designing a public transportation system for the community;
- developing a Web page for the school or a local business;
- designing, building and racing a solar car; or
- growing vegetables and organizing a farmers' market.

Short-term projects may include:

- writing an article for the school newspaper;
- conducting a mock trial;
- diagnosing a mechanical problem with an automobile and writing a report;
- surveying the community about an environmental issue and writing a report on the results;
- writing about a job-shadowing experience; or
- interviewing scientists at a local university.

The scope of a student's project or product should determine the scale of his or her research, planning, evaluating, thinking and problem-solving. Students will be able to practice communication skills by completing a written report and/or an oral presentation.

When students are relatively free to choose a topic or the method of completing a project or product, they can incorporate their own interests. Some students respond best to working with their classmates; others like the independence of working alone. There are many ways to structure products and projects; there is no "right" way.

Application Step No. 2: First, think about the academic and skill standards in your field that might be the basis of an interesting project and get students to think about potential projects. Next, work with students to determine the dimensions of such a project. Ask yourself the following questions:

- What standards will be assessed? What do I want students to know and be able to do?
- What is the nature of the project? Will students work individually or in teams?
- How long will the project last? How many classroom hours will be spent on it? How many hours will be spent out of class?
- How many classes will be involved in the project? How many students?
- What documentation or proof of work will I require?
- How will I determine whether students have acquired academic and technical competencies? How will students be graded? Who will evaluate the work?
- Will students be required to write or speak about their projects or products?

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ject. In one project, a student researched the U.S. Postal Service and kept a journal of a three-day job-shadowing experience with her father, a mail carrier. Another student spent part of her senior year studying quilting and making a quilt of her own. Researching and reporting on an area of expertise contributed to dramatic improvements in many students' communication skills. (Gloucester County Public Schools, Gloucester, Va.)

- All ninth graders participated in a project focusing on Central America and Mexico. Students in English classes researched and created displays, students in mathematics classes analyzed the Mayan calendar and discussed statistics on the Panama Canal, and students in physical science classes studied the area's endangered species. Two weeks of activities culminated in a daylong festival. (Buford High School, Buford, Ga.)

- All 11th-graders conduct research and write articles for journals or magazines in a career field. Each student also prepares a script and visuals for a three- to five-minute in-class presentation. The presentations are videotaped and made available to students who want to learn more about specific career areas. Seniors at this school earn final-exam grades in each academic and career class by completing a project that focuses on an important issue or problem in the student's career field or in the community. The projects, which consist of oral, written, visual and technological components, must show that students have developed knowledge, skills and solid work habits. The projects also must show that students can apply skills across academic and technical disciplines. While developing project proposals and projects, students consult with academic and career teachers and a project adviser. Students keep detailed activity logs to document their reading, research, interviews, plans, problems and progress. A committee reviews the projects and provides input on a set of guidelines used to grade the projects. In April, students rehearse the oral and visual presentations of their written reports. In May, they appear before a review committee. Each student has 30 minutes to present his or her project, answer questions from the committee and make closing remarks. (Academy for the Arts, Science and Technology, Myrtle Beach, S.C.)

Application Step No. 3: Adapt the following outline in planning and assessing projects.

Project Outline

Project Title:	
Course goal(s): Select one or more course goals (statements that reflect the basic knowledge, higher levels of intellectual development and procedural skills students are expected to learn) that this project reflects.	
Theme/topic: Select a theme or topic that: ■ represents a real-world, significant issue; ■ relates to local, state or national standards (what must be taught); ■ is interdisciplinary; ■ relates to students' genuine interests; and ■ leads to student inquiry.	Describe theme/topic:
Essential question: The question that the project addresses should: ■ connect course content to a workplace or community issue; ■ require content knowledge and skills that transcend time; ■ be thought-provoking and difficult to answer; ■ create a need to know.	Write essential question:
Project Description:	

Project activities or tasks List all products and tasks needed to successfully complete the project (prepare a plan, write a report, create a multimedia presentation, make daily journal entries, etc.)	**Standards Students Must Meet to Complete This Project** (What students should know and be able to do)			
	Academic	Technical	Thinking	Personal
Activity 1				
Activity 2				
Activity 3				
Activity 4				
Activity 5				
Activity 6				

Project Assessment Components: List explicit requirements or expectations, criteria and due date for each product or step in the project.			
Component	Requirements	Criteria	Due Date
Project plan			
Journal entries			
Interview records			
Research paper			
Product			
Oral presentation			
Essay exam			

Questions for Judging Major Projects

Good projects will address each of the following questions.

1. **What is a student expected to know?** What specific bits of technical and academic information (symbols, terminology, facts, trends and directions, classifications or categories, common procedures and organizing principles) should a student recall, recognize or know as a result of the project?

2. **What interpretations is a student expected to make?** What translations, interpretations, estimations or predictions should a student make regarding the technical content of the project?

3. **What problems is a student expected to solve?** What problems should a student be able to solve by becoming familiar with the topic, remembering and using the appropriate technical and academic procedures and principles, and correctly applying the appropriate methods?

4. **What analyses is a student expected to perform?** What analyses should a student perform by examining smaller parts of the project and detecting the relationships among the parts and how they are organized? These parts of the project may include data, a production process, a particular technology or material, a product or service, interaction of members of a study or work-site team, and written or oral assignments?

5. **How should a student synthesize what is learned into a new, meaningful framework or product?** Students may be expected to create a unique communication (paper, video, speech, etc.); produce and carry out a plan or a proposed set of operations; or study the facts of a given situation and organize them into a logical, consistent scheme?

6. **What judgments is a student expected to make?** What judgments should a student make concerning the accuracy, economy and effectiveness of a given technology, product, material, procedure or idea in completing the project?

Source: *A Guide to Preparing a Syllabus: Designing Challenging Vocational Courses*, Gene Bottoms, David J. Pucel and Ione Phillips, Southern Regional Education Board, 1997.

Portfolios

A portfolio, a collection of work that demonstrates a student's knowledge and skills, allows teachers and students to gauge students' progress over a period of time. Portfolios can be used for several purposes in the classroom. Students can be asked to collect:

- best work over a semester or a year;
- work to be passed from one teacher to another in a sequence (for example, a student's work in grade nine passes to his or her teachers in grade 10);

- career development materials, such as résumés, job applications, college essays and transcripts, to prepare for experiences after high school; or
- work samples to show to potential employers.

Teachers decide what to require in student portfolios based on two factors: the standards the teacher would like to assess through the portfolios; and the person or people to whom the portfolios will be useful. Each item in the portfolio should be scored or graded separately. The teacher may choose to grade the overall portfolio at the end of the year and to involve outside evaluators, such as employers or other teachers. Students may be required to make presentations on their portfolios and may be graded or scored on these presentations.

Guidelines for Selecting Portfolio Components

The National Center for Research in Vocational Education (NCRVE), in *Getting to Work: A Guide for Better Schools*, provides the following guidelines for determining portfolio components:

- Connect the components to the overall purpose of the portfolio.
- Define the standards and the scoring guidelines for each component.
- Ask students to exhibit or "house" their components in one "file" that an "outsider" can review, evaluate and understand.
- Make sure students understand the instructions and expectations for each component and know how each component relates to the overall portfolio.

Application Step: Before asking students to develop portfolios, answer the following questions:

- What purpose does a portfolio serve in my classroom? What do I want students to demonstrate that they know and can do?
- What is the time span (e.g., a semester) for students to put items into the portfolio?
- Will components be assigned in more than one course? Will the overall portfolio be graded in more than one course?
- Will the portfolio be a collection of existing work completed in the classroom or new activities developed specifically for the portfolio?
- Who will select the work samples to be included in the portfolio?
- Will certain components be required and others optional?
- Will students have another chance to complete or pass each component if they do not complete or pass it the first time?
- Who will evaluate each component?
- What are the consequences of completing or of failing to complete the portfolio?
- How will the portfolio be used after it is completed?

Portfolio Guidelines: Instructions for Students

Now that you have completed your project, (name of project), it is important to reflect on what you did and where you might use this new knowledge in the future. You were expected to learn the following technical competencies in carrying out the project:

[**Teacher: List all competencies here.**]

Your portfolio should include answers to questions about what you have learned.

- Select three technical skills you learned and explain why each one is important in completing such a project. What would happen if one was left out?
- What piece of information did you learn that was most critical to completing the project? Why do you think it was most critical?
- What academic, thinking and personal skills were critical to the satisfactory completion of this project? Did you already have these skills? If not, what did you do to acquire them?
- What products resulted from the project? Explain what you did, how you did it and how the products you produced may be used in the workplace.
- List two real-life career situations in which you could apply what you have learned. What advantage would you have in these situations over someone who did not learn what you did?

You may use narrative statements, photographs and other illustrations to answer these questions. At the end of the project, you will turn in your portfolio for evaluation.

Criteria for Judging Your Portfolio

These questions will help you evaluate work on your portfolio:

- Does your log contain an entry for every day?
- Have you included all tests, evaluation forms and writing assignments?
- Did you answer all questions completely?
- Are your responses unique? Do they represent what you think about the activity, or did you just repeat facts that you learned?
- Could you apply the information and processes you learned to a new set of circumstances? If you answer "yes," explain why you could. If you answer "no," what else do you need to learn?

Criteria for Judging Your Portfolio Presentation

You will be asked to make a presentation based on your portfolio. The following questions will help you prepare for your presentation:

- Does your presentation flow clearly and logically from one idea to another?
- Does the presentation demonstrate how to use what you have learned in real-life situations?
- Do you have all the facts straight so that one point you make does not contradict another?
- Does your presentation convey excitement about what you have learned?

Source: *A Guide to Preparing a Syllabus: Designing Challenging Vocational Courses*, Gene Bottoms, David J. Pucel and Ione Phillips, Southern Regional Education Board, 1997.

Determining Success: Scoring Alternative Assessments

The two approaches used most frequently in scoring alternative assessments are based on experiences in scoring written work. Scoring is best completed with at least two readers. If reliability is a priority, the readers may need to be trained (through the use of sample papers or projects) before they do the actual scoring. In addition, there should be tests for consistency among raters. The two types of scoring are holistic scoring and analytic scoring.

Holistic Scoring

This type of scoring looks at the overall quality of the product and includes a scale related to the level of competence. (In the example below, the scale ranges from "unacceptable" to "deep understanding.") In large-scale writing assessments, a team of experienced teachers reads a "pool" of papers that represent a range in the quality of student work. Readers "benchmark" the papers by rating them on a scale of one to four. Teachers then use the benchmark papers and the rating scale to grade all the students' papers and attempt to reach consensus on scores for the student work.

Criteria for Holistic Scoring

1. Unacceptable ■ Ideas poorly communicated ■ Frequent errors (subject/verb agreement, pronouns and spelling) ■ Incorrect or erratic capitalization, punctuation and spelling ■ Sentence fragments and run-on sentences; few complete sentences ■ No concept of paragraph construction	**2. Not Competent** ■ Poor organization of ideas ■ Frequent errors (subject/verb agreement, pronouns and tenses) ■ Inconsistent capitalization, punctuation and spelling ■ Sentence fragments and run-on sentences; few complete sentences ■ Poor topic sentence; flawed paragraph development
3. Acceptable ■ Ideas sufficiently organized and communicated ■ Occasional errors (subject/verb agreement, pronouns and tenses) ■ Basically correct capitalization ■ Minimum number of sentence errors (fragments or run-ons) ■ Paragraphs have topic sentences, supporting ideas and closing sentences ■ Some attempt at paragraph transition	**3. Deep Understanding** ■ Ideas clearly communicated and of a fairly mature quality ■ No errors in subject/verb agreement, pronouns and tenses ■ Correct capitalization, punctuation and spelling ■ No sentence fragments or run-on sentences ■ Paragraphs have topic sentences, supporting ideas and closing sentences and are developed in a mature fashion ■ Excellent vocabulary ■ Effective paragraph transition

Analytic Scoring

In analytic scoring, readers score students' work based on multiple criteria that are weighted according to their importance to the overall score. The following example's criteria are organization, sentence structure, usage, mechanics and format. The numbers in the right-hand column show the weighting scheme. For example, format is the least important factor in the scoring. Mechanics counts four times as much as format, and organization counts six times as much.

Analytic scoring is better than holistic scoring for diagnostic purposes. Analytic scores can give a teacher an idea of a student's writing weaknesses.

Criteria for Analytic Scoring

	1	2	3	4	5	
Organization	Little or nothing is written. The essay is unorganized, incoherent and poorly developed. The essay does not stay on the topic.		The essay is incomplete. It lacks an introduction, a well-developed body or a conclusion. Coherence and sequence are attempted but are inadequate.		The essay is well-organized. It contains introductory, supporting and concluding paragraphs. The essay is coherent, written in logical order and fully developed.	x6
Sentence Structure	The student frequently uses run-on sentences or sentence fragments.		The student makes occasional errors in sentence structure. He or she does little to vary sentence length or structure.		Sentences are complete and vary in length and structure.	x5
Usage	The student makes frequent errors in word choice and subject/verb agreement.		The student makes occasional errors in word choice and subject/verb agreement.		The usage is correct. Word choice is appropriate.	x4
Mechanics	The student makes frequent errors in spelling, punctuation and capitalization.		The student makes an occasional error in spelling, punctuation and capitalization.		Spelling, capitalization and punctuation are correct.	x4
Format	The format is sloppy. There are no margins or indents. Word-processing is inconsistent.		Word-processing, margins and indents are occasionally inconsistent. The title is either missing or inappropriate.		The format is correct, and the title is appropriate. Word-processing, margins and indents are consistent.	x1

Note: Columns 2 and 4 represent criteria that fall between defined columns.

Source: Adapted from Archbald, D., and Newmann, F. Beyond Standardized Testing. Reston, Va.: National Association of Secondary School Principals (NASSP), 1988.

There are many ways to adapt analytic or holistic scoring. While it is important to define standards and determine acceptable performance levels, it is equally important to communicate expectations so that students know how high to aim. Alternative assessment strategies essentially "give away the answers" and allow teachers to tell students up front what they will be expected to know and be able to do.

Examples from High Schools That Work *sites*

- After eliminating low-level classes, school administrators altered the grading policy. Students earn a passing grade or an "incomplete." An "incomplete" is removed when a student demonstrates that he or she has acquired the competencies. The new policy tells students that failure is not an option. (Westport Academy High School, Westport, Mass.)
- The grading scale for all classes consists of A, B, C and I (incomplete). A grade of I is removed only when a student achieves at least 70 percent on all course objectives. The school offers tutoring in all subject areas during a 90-minute block every other day during the summer session. Summer-school classes are designed to help students remove grades of I. (Holcomb High School, Holcomb, Kan.)

Self-Evaluation and Peer Evaluation

Reflection is a key component of alternative assessment, regardless of the size of the assessment. Students need time to understand what they have accomplished, at what level, and how they will apply the knowledge. Given time and guidance, students can be their own best critics. They often find and correct their own errors. When students assess their strengths and weaknesses, they advance to new levels of learning.

Teachers can utilize peer evaluation by requiring students to exchange papers or other assignments before turning them in. Teachers also can employ the following strategies:

- Give students the evaluation guidelines or benchmarks before the grading begins. Ask students to involve their peers in using the benchmarks to judge their work and make improvements.
- Require students to turn in rough drafts.
- Ask students to get their peers to critique their ideas before they begin working on a paper or a project.
- Require students to write journal entries about their progress in the class.

Application Step: Answer the following questions:

- How do I use self-evaluation and peer evaluation for students in my classroom?
- How can I improve self-evaluation and peer evaluation in my classroom (group discussions, one-on-one meetings, displays, etc.)?
- What types of work lend themselves to self-evaluation and peer evaluation?

Example: Team Scoring Guide

Student names:

A _____

B _____

C _____

Teacher name:

D _____

Student performance:

4 = Excellent 3 = Good 2 = Needs some improvement 1 = Needs much improvement

Scoring criteria	Members of the team			
	A Self	B Team member	C Team member	D Teacher
Group participation Participated in discussion Performed designated role Did fair share of work				
Stayed on topic Paid attention to work Assisted the group in staying on task Stayed with the group				
Offered useful ideas Made suggestions that helped the group Offered appropriate criticism and comments				
Consideration and involvement Gave recognition and credit to others for their ideas Tried to get the group to reach consensus				
Communication Was easy to hear and understand Wrote effectively and clearly				

Source: The Sci-Tech course in the science academy at LBJ High School in Austin, Texas.

Combining Strategies

Assessments show whether a student has met a specified set of standards, and there are many strategies available for this purpose. The strategy a teacher chooses depends on the standards to be measured, the students' learning styles, and the time available. Using multiple assessments can give teachers the most complete information about students.

A portfolio combines several assessment strategies. However, even if portfolios are not used, teachers can (and should) use multiple strategies in the classroom. Many assessment strategies are complemented by a written component or an oral presentation that measures and improves communication skills and enhances students' understanding. Different assessment strategies can be used at different grade levels. Teachers should be creative in combining assessment strategies. Greater variety in strategies increases the amount a teacher will learn about students' strengths and weaknesses. Teachers need to use all of the strategies described in this guide in order to get the best indication of whether students are meeting standards.

Examples from High Schools That Work *sites*

- Mathematics teachers use various assessment strategies. They grade homework and evaluate students' progress through essays, labs, presentations and tests. At the end of the school year, students participate in weeklong assessment activities. They spend part of that time working together on projects, just as they do throughout the year. During the evaluation period, students work on individual tasks at the end of each group session. (Bethlehem Area Vocational-Technical School, Bethlehem, Pa.)
- Each student completes several projects: an education-and-career portfolio; school-sponsored and/or school-approved activities, including work-based learning; and a senior project. The senior project begins in ninth grade with topic exploration. Students research the project in grade 10 and receive mentoring from a teacher or a business/industry representative in grade 11. They then complete a paper, a project and a presentation in grade 12. (North Laurel High School, London, Ky.)

Application Step: How will you use multiple assessment strategies in the classroom? Think about the assessment plan for your course, and use the following form as a guide in developing a proposed plan. What is the grading scale? How will you ensure that students meet all of the standards?

Sample Assessment Plan

Assessment strategy	Description	Weight
Writing assignment with presentation	Students will be graded on a short research paper on a chosen topic that relates to a vocational area. They will present the results to the class.	33%
Project	Students will complete a project that offers three options for solving a problem.	33%
End-of-course exam	Students will take a paper-and-pencil test as a cumulative assessment of their knowledge.	33%

Guiding Principles for Using Assessment to Improve Student Learning

- **Use multiple assessment strategies.** Using a variety of assessment strategies will give you an accurate picture of your students' knowledge and skills and will help you vary your instructional methods.
- **Set and uphold clear and challenging standards.** It is important to have standards that clearly define what teachers need to teach and students need to learn, and it is equally important to uphold and assess those standards. Set standards in academic, technical, work-readiness and personal areas.
- **Teach students to research, plan, think, solve problems, evaluate and become independent learners.** Projects and portfolios require students to be responsible for their own learning.
- **Incorporate opportunities for students to use skills throughout the curriculum so that they will not feel overwhelmed when they are assessed through alternative methods.** Students who can research, plan, think, solve problems and evaluate will have a greater chance of succeeding in experiences after high school, when less guidance and support are available.
- **Build on students' interests and experiences.** Students have a broad spectrum of interests and experiences. Incorporate these assets into curricula and assessments. Students who take an interest in learning achieve at a higher level and exhibit fewer discipline problems. Use alternative assessment methods to make the most of students' unique characteristics. School cannot always be fun, but it can be interesting and engaging.
- **Motivate students through consequences.** Students want to know what will happen if they do or do not meet standards. The answers will influence how they perform. Motivation can be internal, such as a desire to outperform other students when making a presentation in front of peers. Motivation also can be external. If students think potential employers will look at their portfolios, they will work hard to collect their best work.